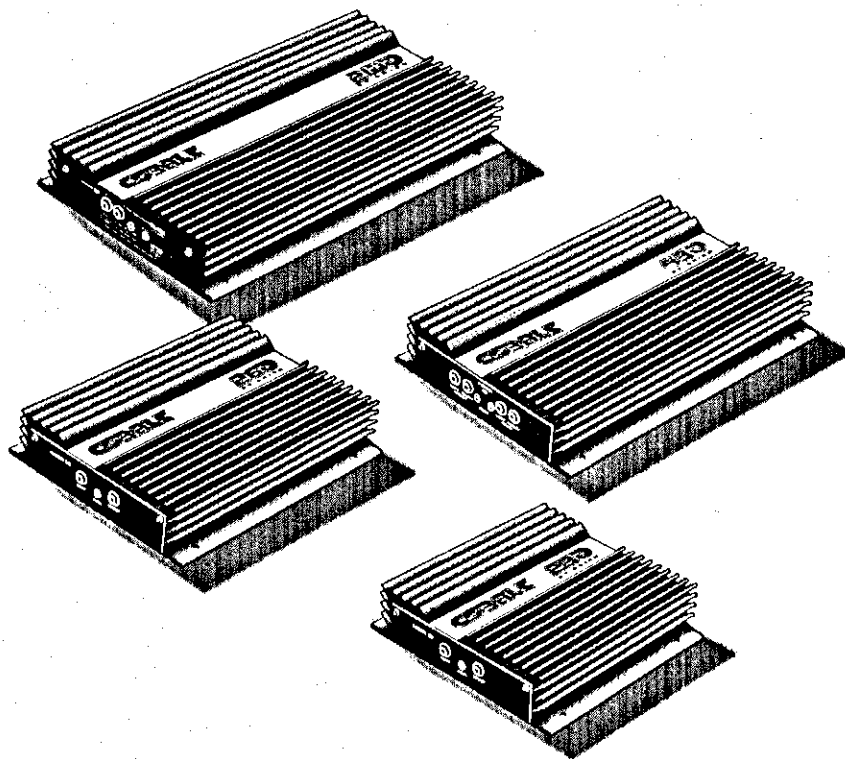


INSTALLATION MANUAL

COBALT Series

POWER AMPLIFIERS



 **ORION**

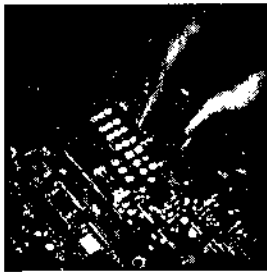
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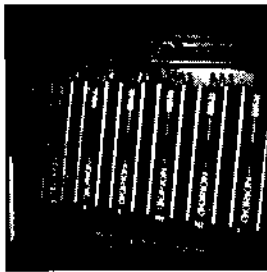
DESIGN

All Orion amplifiers are designed on our sophisticated CAD system, utilizing the latest technology available.



PRODUCTION

All Orion amplifiers are Made In The USA, with high-quality double-sided PCB boards containing superior-grade components.



PRODUCT USE

The Cobalt Series sets new standards for performance and reliability.

They can attain Sound Pressure Levels well in excess of 110 dB. Use common sense and wear hearing protection when appropriate.



INTRODUCTION

You have purchased the finest car audio power amplifier available on the market today. Your Cobalt amplifier (Model CO 230, CO 260, CO 430, CO 2100) incorporates the latest technological advancements to exceed current measurement standards of performance, craftsmanship, and reliability.

All our amplifiers contain the following built-in features:

- Wide Bandwidth, MOSFET, Class AB Output for full, clean reproduction of all frequencies, without any compromise of deep bass sound
- Localized Feedback Design for extremely fast Transient Response and reduction of Harmonic and Intermodulation Distortion
- Dynamic Current Limiting, to protect the amplifier by reducing its power supply voltage when minimum load impedances are exceeded on either channel
- A Smart MOSFET Power Supply with second-order RFI (noise) filtering that is energy efficient, reliable, and can actually sense a variety of interconnect problems like shorted speaker leads, power ground problems, audio ground problems, and low electrical system voltage
- Bridging Capabilities for Mono and Mixed Mono Installations
- A single Variable Input Sensitivity control for precise level matching of Control Head Unit outputs to amplifier inputs
- FET switched 40 dB audio attenuator to reduce turn-on/turn-off "thump"
- Aluminum Heat Sinks for efficient dissipation and reflection of heat

In addition, all our amplifiers are made in the USA with high-quality, double-sided printed circuit boards, containing superior-grade components. Be assured that before you bought this superbly-built amplifier, it was thoroughly tested and is now ready for the most demanding of situations. This amplifier has passed an extensive five-step quality control inspection, culmination in a two-hour "burn-in" under actual operating conditions. If it had failed, it wouldn't be in the box!

To aid you in enjoying this premium product, please take a few moments to read through this manual before installing the amplifier in your new or existing system. Once the amplifier is carefully installed and you listen to it for the first time, you will be astonished at its sound quality and power. From that moment on, your Cobalt amplifier will provide you with years of pure sonic enjoyment!

Please fill out and send in the warranty card that is packed with your amplifier. For future reference, also fill in the information requested in the blanks below.

MODEL: _____

SERIAL NO: _____

DATE OF PURCHASE: _____

DEALER: _____



DESCRIPTIONS

The CO 230, CO 430, and CO 260 are car stereo amplifiers that provide 30 and 60 watts rms power per channel into a 4 ohm load, respectively. The CO 430 is a special model for four-channel applications. The CO 2100 is a car stereo amplifier that provides 100 watts rms per channel into a 4 ohm load, or 200 watts rms per channel into a 2 ohm load in stereo. In mixed mono or summed it can alternatively provide 350 watts rms into a 4 ohm load and may be used for subwoofer systems. The CO 2100 features a continual low pass filter that ranges between 35 Hz and 200 Hz. Other than power rating and physical size, these four models, shown in Fig. 1, have several features in common, and similar electrical specifications (see Specifications on page 26).

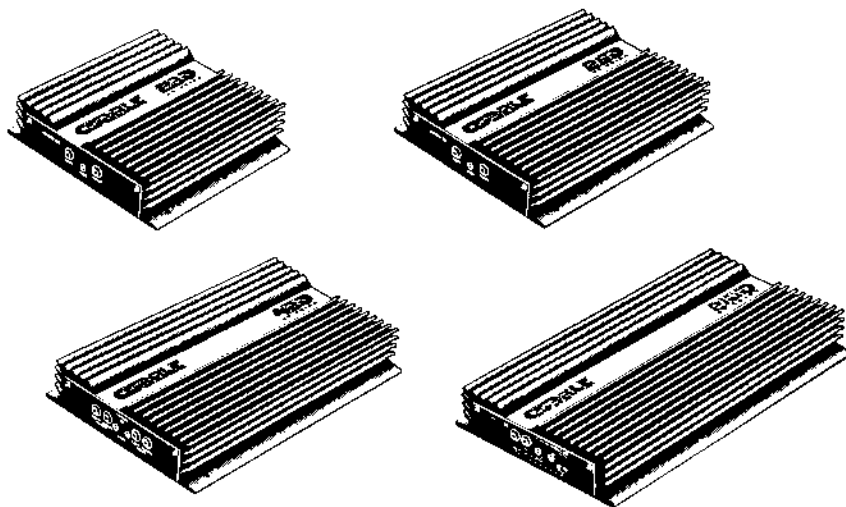


Fig. 1. CO 230, CO 260, CO 430 and 2100 car stereo amplifiers.

Depending on your audio system requirements, any model is an excellent choice for full-range sound that will exhibit smooth highs and rich, tight bass. Or any model can be put to work a part of a system that will drive satellite speaker sets (e.g., tweeters and mid-range speakers) or sub-woofers.

INPUT CONNECTIONS AND CONTROLS

As shown in Fig. 2, and Fig. 3, the CO 230, CO 260 and CO 430 input connections contain LEFT INPUT and RIGHT INPUT connectors, GAIN Control, and a POWER indicator.

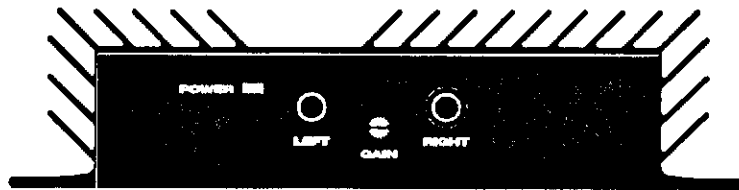


Fig. 2. Front panel layout for 230 and 260 amplifiers.

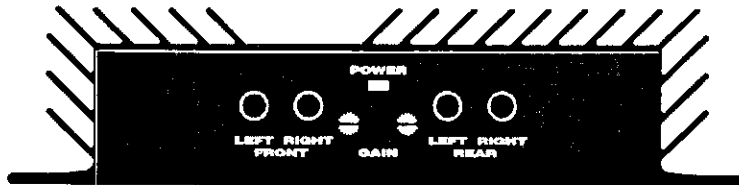


Fig. 3. Front panel layout for the 430 (4-channel) amplifier.

INPUT CONNECTIONS AND CONTROLS

As shown in Fig. 3A, the CO 2100 input connections contain a MONO/STEREO button. The LEFT INPUT and RIGHT INPUT connector functions are standard when the MONO/STEREO button is set on STEREO. When the MONO/STEREO button is set on MONO the LEFT INPUT channel is full range mono, and the RIGHT INPUT channel is low pass only mono.

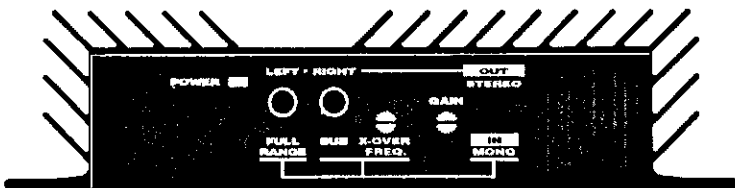


Fig. 3A. Front panel layout for the 2100 amplifier.

The LEFT INPUT and RIGHT INPUT connectors are gold-plated, ground isolated RCA jacks. Amplifier input impedance is rated at 10k ohms.

NOTE: The GAIN Control is not a Volume Control! It enables you to adjust the amplifier's nominal operating level for proper level match from any brand control head unit or radio.

A POWER indicator lights whenever DC power reaches and activates the internal amplifier circuits.

INPUT CONNECTIONS AND CONTROLS

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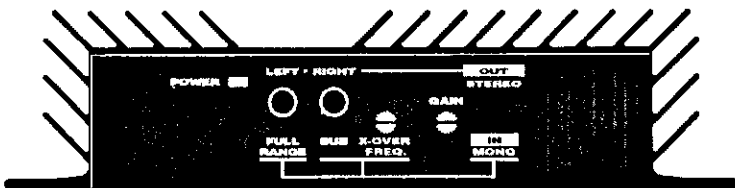


Fig. 3A. Front panel layout for the 2100 amplifier.

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NOTE: The GAIN Control is not a Volume Control! It enables you to adjust the amplifier's nominal operating level for proper level match from any brand control head unit or radio.

A POWER indicator lights whenever DC power reaches and activates the internal amplifier circuits.



PLANNING YOUR CAR AUDIO SYSTEM

Before starting the installation, you need to consider the type of car audio system you want, so that you can purchase any needed components. For example, will your system be a brand new installation, or will it be an upgrade to an existing system? Do you want a basic single-amplifier design that uses existing full-range speakers, or a high-powered multi-amplifier system that drives a host of satellite speakers and sub-woofers. Will your system be stereo or mixed mono?

This section deals with these topics and more. Several example systems are presented here in a building block approach. You can start with a simple system and then, at a later date, add more amplifiers, speakers, and accessories to come up with a system of your own design. After you've finished reading this section, proceed to the Installation chapter.

NEW BASIC SYSTEM

An ideal basic stereo system can be designed with a control head unit, a CO 230 amplifier, and a pair of full-range loudspeakers. If you want more power, then choose the CO 260, or CO 2100 amplifier to drive your system.

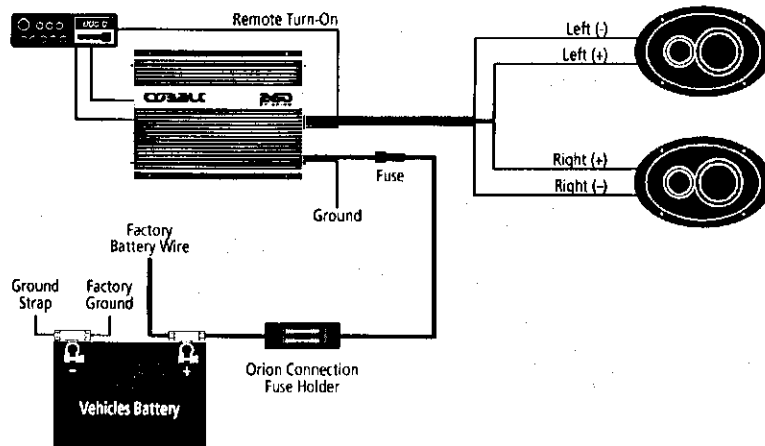


Fig. 4. An example of upgrading a basic factory system (no fader control) by using a CO 260 amplifier.

If you want more low end punch, add one or more sub-woofers and then reconfigure the CO 230, CO 260, or CO 2100 amplifier wiring for Mixed-Mono Bridged operation, as shown in Fig. 4. For optimum sound, add an equalizer like the 300 PHD between the control head unit and amplifier, to tailor the sound output for your car's environment.

UPGRADING A BASIC FACTORY SYSTEM

Many new cars come equipped with a factory-installed AM/FM cassette radio that drives two sets of speakers, usually located in the front dashboard and rear deck plate. You can vastly improve the sound of the factory installation by adding a CO 230 amplifier between the radio and speakers, as shown in Fig. 5. For more power, choose the CO 260, or CO 2100 to drive your system.

If your radio has RCA jacks on the back, then the connection to the amplifier is a straight run with a pair of high-quality RCA cables from the radio to the amplifier's left and right inputs.

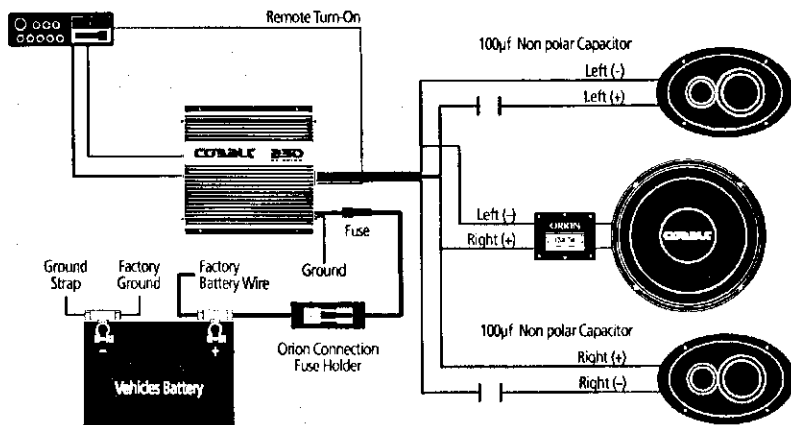


Fig. 5. An example of a new basic system using a CO 230 amplifier. No Fader Control is possible with this system configuration.

MULTI-AMPLIFIER SYSTEMS

For precise staging and raw power, you can implement a more sophisticated system by using two amplifiers with satellite speakers, as shown in Fig. 6.

The pre-amp outputs from the control head unit actively split into two frequency bands by using a crossover like the 200 SPX.

Stereo pairs of tweeters and mid-range speakers are driven by a CO 230 amplifier, fed by the crossover's high output. Sub-woofers are driven by a CO 260 amplifier in stereo or Summed-Mono Bridged configuration, with the feed from the crossover's low output.

NOTE: As an alternative, you can purchase XTREME Dual Voice-coil sub-woofers.

For greater sound contouring, add a 300 PHD equalizer between the control head unit and 200 SPX active crossover.

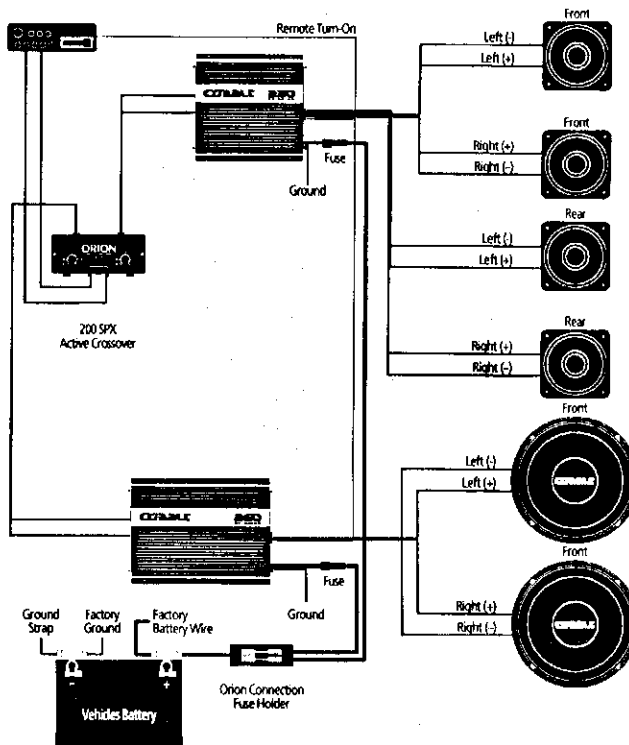


Fig. 6. An example of a multi-amplifier system, using a CO 230 amplifier to drive stereo pairs of full range speakers, and a CO 260 amplifier to drive a pair of sub-woofers.

MULTI-CHANNEL AMPLIFIER

We designed the CO 430 to be more than just a standard 4-channel amplifier. Depending on the speaker wiring, you can configure the CO 430 as a 2-, 3-, 4-, 5-, or even a 6-channel amplifier, as shown in Fig. 7A and Fig. 7B.

NOTE: The examples in Fig. 7A and Fig. 7B are only a few of the audio systems possible with the CO 430 amplifier.

For a high-powered 2-channel amplifier, connect a pair of full-range speakers in a bridged wiring scheme to obtain 120 watts rms (at 4 ohms) at each speaker.

For 3-channel operation, connect full-range speakers to the CO 430 front stereo outputs, and add a sub-woofer with an Orion Connection CSX-T14 passive crossover to the rear connections in a Mixed-Mono Bridged configuration.

For a 4-channel amplifier, use the CO 430 as Front and Rear stereo amplifiers. Connect full-range or component-type speakers with Orion Connection passive crossovers in this configuration.

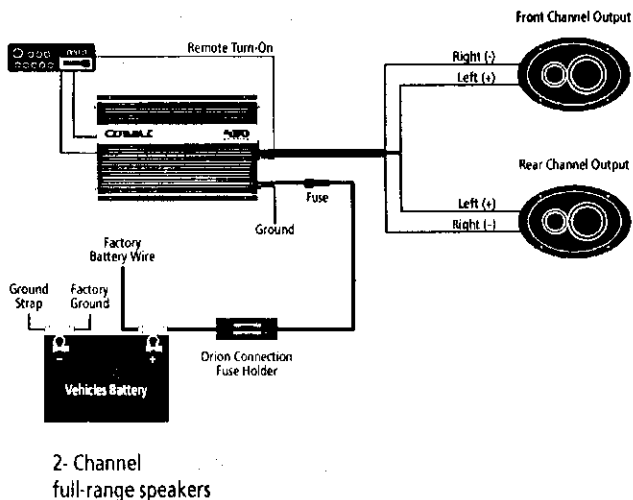


Fig. 7A. 2 channel configurations for the CO 430

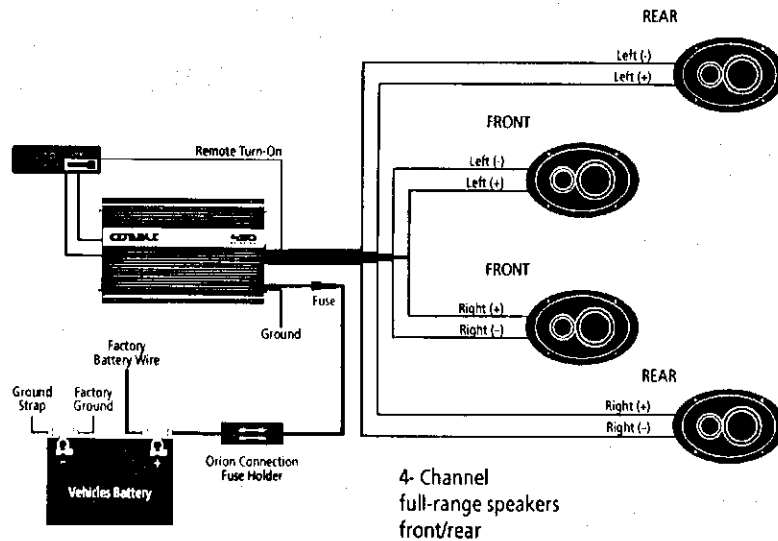
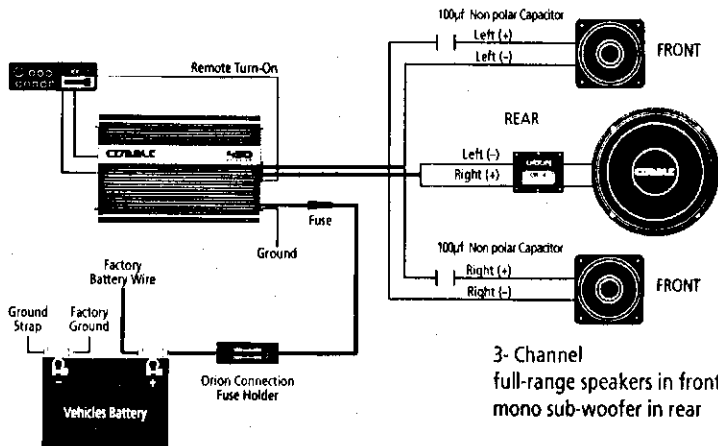


Fig. 7B. 2 and 3 channel configurations for the CO 430

CO 2100 SAMPLE SYSTEMS

We designed the CO 2100 to be more than just a standard amplifier. The CO 2100 shares all of the standard features available with the CO 230 and the CO 260. In addition, the CO 2100's Stereo/Mono button allows flexibility in system design. The CO 2100 performs similarly to the CO 230 and CO 260 when set to stereo.

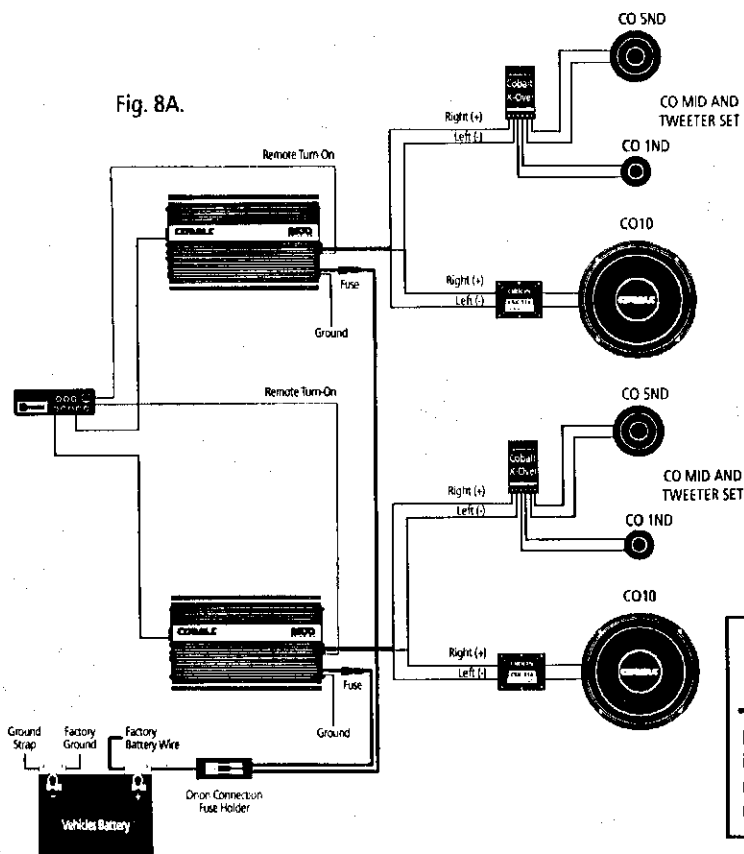


Fig. 8B and Fig. 9B show the input connections of the CO 2100 up close to clarify how it is used in each system.

FULL RANGE SYSTEM

Fig. 8A. An example of CO 2100 amplifiers configured for right and left channel mono bridging (button in.) Each amplifier feeds a Cobalt Mid and Tweeter Set, and a CO 10.

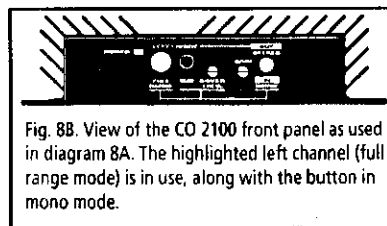


Fig. 8B. View of the CO 2100 front panel as used in diagram 8A. The highlighted left channel (full range mode) is in use, along with the button in mono mode.

Depending on the Stereo/Mono button setting, the CO 2100 can be configured in a variety of systems. The following system designs show examples of CO 2100 uses in systems with its button in mono setting. The system shown in Fig. 8A, the mono button is in and the left input is in use (full range mono mode). In the system shown in Fig. 9A, the mono button is in and the right input is in use (crossover mode, low pass only). Using more than one CO 2100 amplifier in your system will allow greater flexibility in it's design.

SUB ONLY SYSTEM

Fig. 9A. An example of CO 2100 amplifiers, configured for sub input (button in). Each amplifier feeds a CO 10 sub-woofer.

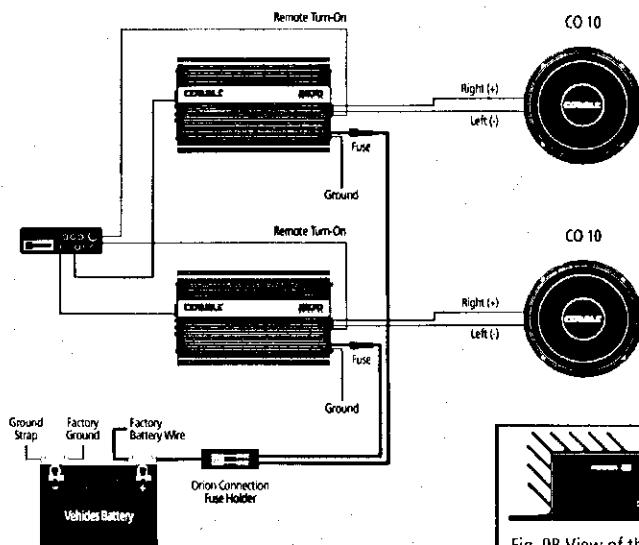


Fig. 9A.

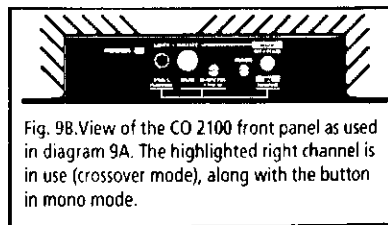


Fig. 9B. View of the CO 2100 front panel as used in diagram 9A. The highlighted right channel is in use (crossover mode), along with the button in mono mode.



POWER CONNECTIONS AND SAFEGUARDS

As shown in Fig. 10 and Fig. 11, the rear face-plate projects short wires for DC power connections and a female plug that contains speaker and Remote Turn-On connections. The 12 gauge solder-tinned red wire (with built-in fuse holder) goes to your car's positive battery connection, while the 12 gauge black wire with lug is bolted to metal chassis for power ground (see Installation, starting page 16).

NOTE: The (+) power wire on each amplifier must be connected directly to the positive battery terminal.

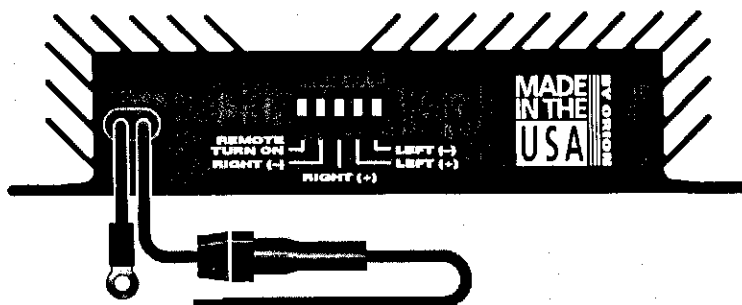


Fig. 10. Rear panel layout for Cobalt 230, 260, and 2100 amplifiers

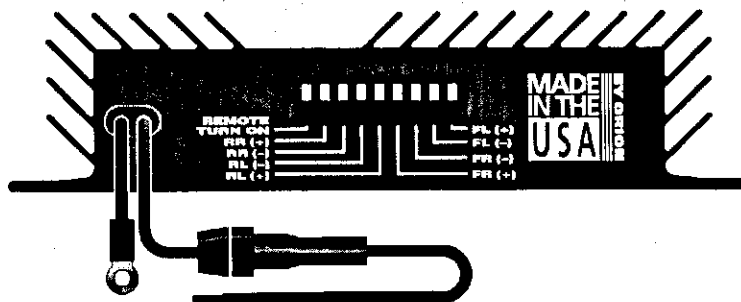


Fig. 11. Rear panel layout for the Cobalt 430 amplifiers

Each amplifier uses a DC switching circuit to multiply the incoming 12 VDC to the higher DC voltages needed for a high-power design. The switching time is optimized for efficient energy conversion and minimum radiation of RFI (Radio Frequency Interference). A second-order filter is included in the design to further reduce any potential interference artifacts.

The amplifier is turned on remotely via the connection on the male plug that inserts into the end of the amplifier. When properly installed (see Installation, starting on page 16), you'll hear a gradual level change when you power on the control head unit. Within two seconds, the amplifier will be at the level you've set on the volume control. With this feature, you have time to judge and adjust the loudness level without having to experience an immediate sonic blast.

Built into each amplifier are two additional fail-safe features. A thermal protection circuit senses the temperature of the heat sink and will turn off the amplifier if the unit becomes too hot (see Trouble-shooting Guide, on page 25). Once the amplifier has cooled down, the thermal protection circuit will automatically turn the amplifier on again. An external fast-blow fuse, installed in-line with the positive DC line (red wire), protects the amplifier from any catastrophic system failures.

Each amplifier also includes a soft-start feature, to minimize turn-on "thump". Protective monitor circuits in the output stages will shut down the amplifier in case of a speaker failure or a short circuit in speaker wiring.



SPEAKER CONNECTIONS

On the CO 230, CO 260, and CO 2100 amplifiers, the male plug (see Fig. 10 on page 12) provides Left and Right speaker connections. Speaker wire is not included. We recommend 16 GA or bigger, size of XTREME speaker cable. On the CO 430 (4-channel) amplifier, the male plug includes additional connections for the rear channels.

In addition, each amplifier model can be configured for Summed-Mono Bridging or Mixed-Mono Bridging (see Planning Your Car Audio System, starting on page 5).

Since low frequencies are non-directional (i.e., you feel the sound rather than locate it), and more power is needed to reproduce bass sounds, sub-woofers can be driven in a mono configuration. The higher, more directional sounds (e.g., vocals and solo instruments) don't require as much power for loud reproduction; therefore, these signals can be reproduced in stereo, which provides the listener with essential positions for accurate sound staging.

Summed-Mono Bridging provides more power (than a stereo channel) to one or more sub-woofer speakers, as shown in Fig. 12 on page 15. The stereo signal, coming from a Control Head Unit, is routed to the (left and right) inputs of an active crossover. The crossover's low (left and right) outputs are summed to mono via an RCA "Y" cable enroute to the amplifier (left and right) inputs. One or more loudspeakers is then connected (in parallel) to the amplifier's Left(-)/Right(+), while the Left(+) and Right(-) are not used. The woofers must be connected so that the impedance is 4 ohms or above.

NOTE: Summed-Mono Bridging is used exclusively to drive sub-woofer systems. When planning this configuration, make sure the total nominal sub-woofer impedance is not less than four ohms. Use a series wiring scheme for connecting two four-ohm sub-woofers, as the total nominal impedance of eight ohms will not significantly change the sound output in the Summed-Mono Bridging mode.

Mixed-Mono Bridging is implemented by connecting one or more pairs of tweeters and mid-range speakers to the stereo signals, while one or more sub-woofers receives the mono signal. Unlike Summed-Mono Bridging, all speaker wire connections are used to realize this system.

NOTE: For the CO 230 or CO 260, a front-to-rear Fader Control is not available with Mixed-Mono Bridging, because only a single 2-channel amplifier drives both satellite and sub-woofer speakers. However, Fader Control is possible for the CO 430 amplifier, since this model provides four channels. Refer to page 9 for more details.

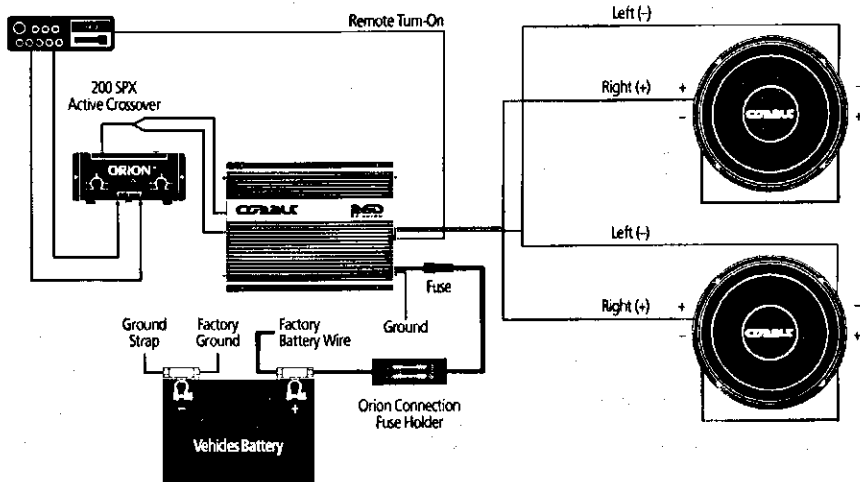


Fig. 12. An example of a CO 260 amplifier, configured for Summed-Mono Bridging, feeding a pair of DVC sub-woofers. NOTE: Only the LOW outputs from the 200 SPX Active Crossover are shown.



INSTALLATION

This section details Mechanical and Electrical procedures you'll need to perform to install Cobalt amplifiers. Take a moment to look over the list of tools and additional parts needed to successfully complete the job.

REQUIRED TOOLS

- Electric Drill/Drill Bits
- Utility Knife
- Phillips and Flathead Screwdrivers
- Pliers (standard and needle nose)
- Wire Cutters/Strippers
- Wire Crimping Tool
- Wire Brush and Emery Sandpaper (for metal)
- Rubber Grommets
- Heat Shrink Tubing
- Soldering Iron and Solder
- Nylon Tie Wraps
- Volt/Ohm Meter (VOM or DVM)
- Felt-tip Pen or Spring Loaded Center Punch Tool

OPTIONAL PARTS

The Orion Connection carries everything you need to complete your car audio system. Visit your Orion dealer and check out genuine Orion Connection Installation Accessories.

- MBR 70 Multiple Battery Regulator
- Modular Power Distribution (POWER BLOCKS)
- Modular Fuse Holders (POWER BLOCKS)
- XTREME Speaker Cable
- Power Cable, Ground Cable
- Battery Terminals
- Audio Interlink Cables (RCA)
- Passive Crossovers
- Raw Crossover Components
- Automotive Carpet, Vinyl & Grill Cloth
- Damping Material
- Cosmetic Integration Accessories

REQUIRED PARTS

The following parts are packed with Cobalt amplifiers:

- Male Speaker Plug Pigtail Harness
- External Fuse Pigtail Assembly
- Fast-blow Fuse
- Butt Splice
- 4 Metal Self-tapping Phillips Screws

The following parts are not included in the packaging:

- 15-20 ft. 10 Gauge Orion Connection Power cable.
- 15-20 ft. Turn-on lead.
- Fuse-holder and fuse for connection at battery.
- No. 10 Self-tap Metal Screw, or Large Carriage Bolt (to attach amplifier ground wire to chassis)
- 16 Gauge or Larger Orion Connection Xtreme Speaker Cable
- Orion Connection High Quality RCA Cables

GENERAL PRECAUTIONS

Before installation, make sure you pick a location that will provide adequate ventilation around the amplifier. The Cobalt amplifier has massive heat sink fins to couple generated heat to surrounding air space via thermal conduction. However, if the amplifier is mounted in a tight space without any air movement, over time the amplifier can damage itself, in spite of its thermal fuse protection circuits.

Therefore, we recommend that you mount the amplifier flat on the floor under the front seat or in the front of the car trunk (under the rear deck plate). Remember, heat travels up away from the heat sink fins. In addition, please observe these precautions:

- Do not touch the amplifier during operation.
- Do not mount the amplifier on a plastic surface or other low combustion-point material. The heat generated by the amplifier during operation will melt plastic and may scorch or even burn some materials.
- Do not place a glass or metal cover over the top of the amplifier unless you have a cooling fan at one end.
- Direct cool air along the length of the fins, rather than across them, for the most efficient cooling. Remember, any moving air will dissipate heat.
- Keep hands free from grease or dirt, as the anodized finish will show fingerprints.



CAUTION: THE EXTERIOR OF THE AMPLIFIER GETS HOT AND MAY BURN YOUR SKIN.

MECHANICAL INSTALLATION

1. Select a mounting location. Make sure you observe the General Precautions listed above.
2. Position the amplifier and use either a felt-tip pen or spring-loaded center punch tool to mark locations for the mounting holes.
3. Drill a small pilot hole at each marked location.



CAUTION: DO NOT DRILL INTO FUEL TANK, FUEL LINES, BRAKE LINES, (UNDER CHASSIS), OR THROUGH ANY ELECTRICAL WIRING.

4. Mount the amplifier in the desired location and securely tighten the four self-tapping screws, as shown in Fig. 13.

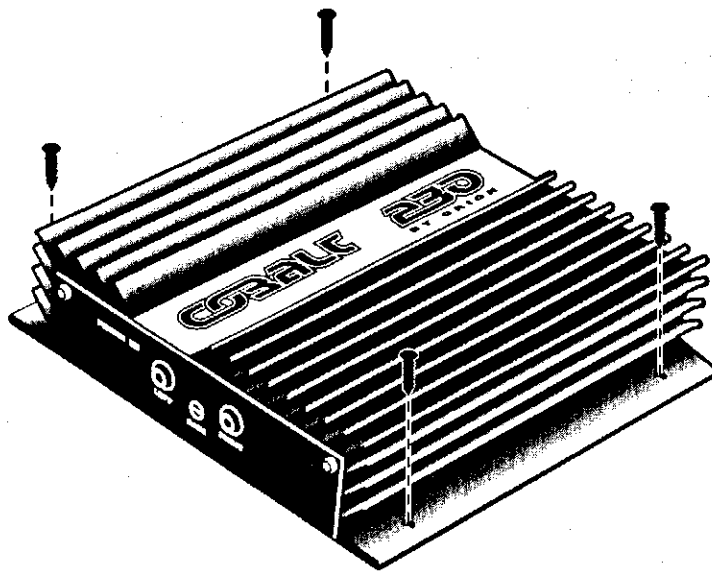


Fig. 13. Mounting hole locations on a COBALT 230 amplifier.

ELECTRICAL INSTALLATION

Wiring Precautions

- Improper wiring connections can seriously damage amplifiers, accessories, or speakers. Be sure to carefully follow the connection instructions in this manual. If you are not sure of the connections, contact your dealer.
- Disconnect the positive (+) lead at the battery before making any power connections.
- Be sure to connect the amplifier's positive (+) power lead directly to the positive (+) terminal on the battery. Do not connect this wire to the car's fuse panel. Use Orion Connection 10 awg. power cable wire to extend the amplifier's positive (+) power lead.
- Before installation, make sure the radio or control head unit POWER switch is in the OFF position.
- When making connections, be sure that each connection is clean and properly secured. Failure to do so may result in damage to your equipment.
- When replacing the amplifier's fuse, always use one having the same current rating. Using a higher-rated fuse or a slow-blow type can result in serious damage to the amplifier.
- Never ground the speakers to the vehicle chassis or body. If this occurs, you can expect severe noise problems and, in case of bridging, a canceling of the mono signal.
- Make sure that your vehicle has enough power to handle your current set-up and the newly installed amplifier and accessories. If you are planning a multi-amplifier system, you may need to add a second battery and possibly a MBR 70.
- In an ideal wiring scheme the power wire from the amplifier is run along one side of the vehicle to the battery.

The remote turn-on wire and RCA audio cables are run down the center vehicle. The speaker wires are run along the remaining side.

The idea is to keep signal groups away from each other. When wires are parallel to each other, electro-magnetic fields generated by current flowing in the wires can cross-couple and cause interference in the low-level audio cables. If two groups of wires must cross each other's paths, make sure they are routed in a perpendicular fashion, as shown in Fig. 14.

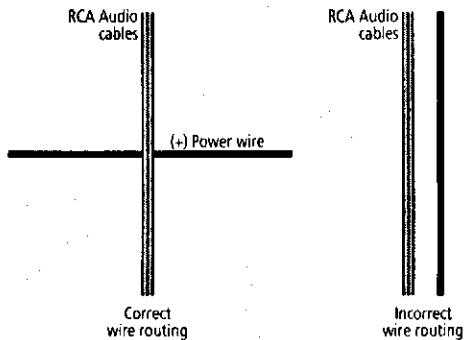


Fig. 14. Correct and incorrect wire routing practices.

AMPLIFIER WIRING

Before you connect your amplifier, verify that your vehicle's electrical system can support an additional load (at maximum output) for each COBALT amplifier you plan to install. Most existing factory-installed electrical systems can handle the additional current draw needed to power a single CO 230, CO 260, or CO 430 amplifier.

If you are planning a multi-amplifier system, your vehicle's electrical system may require an extra battery and possibly an Orion Connection MBR 70 to supply the additional current draw. If you're not sure of your needs, consult your local Cobalt dealer.

Refer to the wiring diagrams in Figures 4 through 7 as you connect each amplifier:

1. With the ignition off, disconnect the positive (+) lead and negative (-) lead from the vehicle's battery.
2. Replace the negative (-) battery-to-chassis lead with a new 1" ground strap. Make sure the connections are clean and secure. Keep the original engine-to-chassis ground connection intact (refer to Fig. 17 on page 22).



CAUTION: DO NOT RE-CONNECT THE POSITIVE (+) LEAD AT THIS POINT.

3. Locate a metal chassis component that is within the reach of the amplifier's attached ground (black) wire. Cut away any carpet and scrape off the body paint to expose bare metal. Sand the area with sandpaper until you see a bright, shiny finish.
4. Drill a small pilot hole (0.125" diam.) in the selected area and use a No. 10 self-tapping screw to securely attach the crimped lug (on the end of the ground wire) to the metal chassis, as shown in Fig. 15.



CAUTION: DO NOT DRILL INTO FUEL TANK, FUEL LINES, BRAKE LINES (UNDER CHASSIS) OR THROUGH ANY ELECTRICAL WIRING.

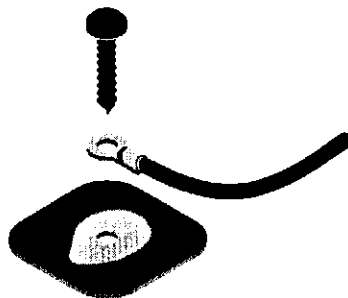


Fig. 15. Mounting the amplifier's GROUND lug to the vehicle's (bare metal) chassis.

5. After the ground has been properly attached, cover the exposed bare metal with paint or grease to prevent rust.

NOTE: A secure, clean ground connection is critical to the performance of your Cobalt amplifier. **DO NOT LENGTHEN THE AMPLIFIER'S GROUND WIRE.** Doing so adds resistance and increases the probability of hum pickup and electromagnetic interference.

6. Repeat steps 1 through 5 for each additional amplifier being installed.
7. Locate the amplifier's (red) power wire and splice on the 20 foot (red) wire extension.
8. Route the (red) power wire along the vehicle's interior wiring channels (e.g. floor boards) and through the fire wall, until it reaches the vehicle's battery posts. At convenient points, fasten the power wire to the vehicle's body with tie wraps. Use this technique to keep the wire from dangling across engine components.

NOTE: If you need to create passage holes for the power wire routing, be sure to use grommets to eliminate any sharp edges created during drilling that may nick the power wire and cause a short circuit.



CAUTION: DO NOT CONNECT THE POWER WIRE TO THE BATTERY TERMINAL. (THIS CONNECTION WILL BE MADE IN STEP 17, AFTER OTHER CONNECTIONS HAVE BEEN MADE).

9. Locate the male plug and attach the Remote Turn-On (blue) wire extension. Attach the wires by inserting them into the end of the male plug and tightening the set screws. Use a butt splice, or solder the connection and cover the joints with shrink tubing if making any speaker connections between your wire coming out of the male plug and your speakers.

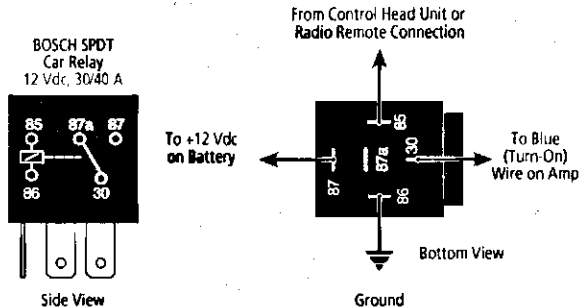


Fig.16. As an option, install a Bosch relay that will substitute battery voltage for low Remote voltage

NOTE: Some control head units or radios may produce a low Remote voltage that will not turn-on the amplifier. If this is the case, you will need to install a relay that uses battery voltage instead, as shown above.

10. Route speaker wires from each speaker location to the amplifier's location. Make the appropriate connections (e.g., crossovers, satellite speakers, etc.) as defined by your system design. Trim any excess wire and be sure to observe correct speaker polarity during connection. Use tie wraps as needed, and watch for any sharp edges on passage holes.



CAUTION: DO NOT SOLDER WIRES DIRECTLY ONTO SPEAKER TERMINALS. DOING SO MAY VOID THE MANUFACTURER'S WARRANTY. INSTEAD, USE CORRECT SIZE TERMINAL CLIPS TO CONNECT SPEAKER WIRES TO SPEAKER TERMINALS.

11. Insert the male plug with attached blue wire into the female receptacle in the end of the amplifier.
12. Repeat steps 7 through 11 for each additional Cobalt amplifier being installed.
13. Locate the Left Input and Right Input (RCA) jacks on the amplifier. Insert one end of the RCA audio cables into the jacks.

NOTE: Choose high-quality RCA cables (preferably Orion Connection) that are not much longer than the length needed to interface directly with the control head unit, radio, or equalizer. Unnecessary additional cable can cause signal loss and noise pickup.

14. Route the blue turn-on wire and the RCA audio cables to the rear panel of control head unit, radio or equalizer and make the appropriate connections to Remote Turn-On and Audio Left and Audio Right (RCA) Outputs. Use tie wraps as needed, and watch for any sharp edges on passage holes.

NOTE: The rear panel should contain identifiers for Remote Turn-On, Audio Left Output, and Audio Right Output connections. If not, either read the product's Owner's Manual, or consult with your car or truck dealer for more information. Also refer to section on Planning Your Car Audio System, starting on page 4.

15. Repeat steps 13 through 14 as needed to implement a multi-amplifier design.
16. Make sure the vehicle's Ignition Switch and the POWER Switch on the Control Head Unit or Radio, are both in the OFF position.
17. Trim the (red) power wire so it meets the + battery post. Splice a ring terminal on the bare end and fasten the lug onto the post, as shown in Fig. 17. **MAKE SURE A FUSE IS INSERTED WITHIN 12" OF THE BATTERY CONNECTION.**
18. Check all the connections and, once you're satisfied, perform the steps listed in Setting Up Your Cobalt Amplifier (see page 23).

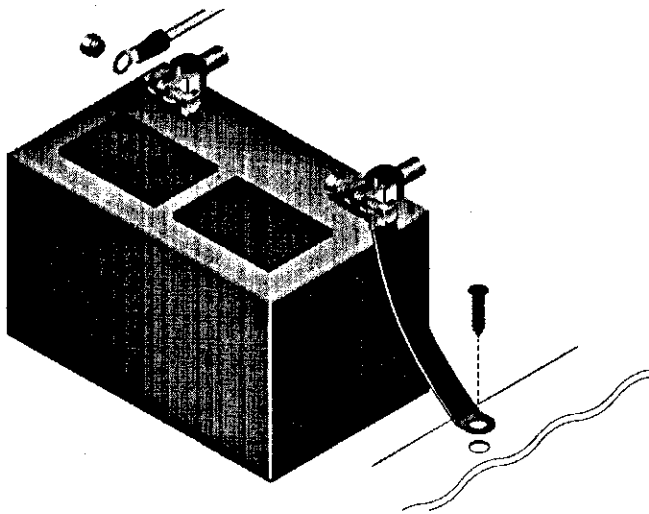


Fig. 17. Connecting the amplifier (+) power wire to the vehicle's battery.

SETTING UP YOUR COBALT AMPLIFIER

After completing the steps listed in the Installation section, you are ready to set the amplifier's Input Gain and perform final system checks.

Setting Input Gain

1. Turn the vehicle's Ignition Switch to the ON position.
2. Turn the ON/OFF Switch on the Control Head Unit (or Radio) to the ON position.
3. Select a known stereo FM station with a strong signal for the following tests. Make sure all Tone or Equalization controls are left in the "flat" position, and any Loudness button is out of circuit.
4. Observe that the POWER indicator on the Cobalt amplifier lights.
5. If the system includes an Equalizer like the 300 PHD, set all frequency controls to "flat" position, and then turn its overall gain to maximum level.
6. Slowly increase the GAIN Control on the amplifier, until you hear slight clipping. At this point, the amplifier is calibrated for maximum dynamic range without distortion. (On the CO 430 amplifier adjust the Front GAIN Control, and then adjust Rear GAIN Control.)

FINAL SYSTEM CHECKS

1. Start the engine and turn the ON/OFF Switch on the control head unit or radio to the ON position. Slowly increase the Volume Control to about the 10 o'clock position and listen to the audio reproduction. The sound level should slowly ramp up over two seconds to the setting you've picked. The sound you hear should be clean and solid. If you hear any noise, static, distortion, or no sound at all, go back over the connections listed in the Installation section, and also refer to Troubleshooting Guide (see page 25).

NOTE: *Depending on the system design, the sound levels may become quite loud even at low Volume Control settings. Use restraint when first positioning controls, until you get an "audio feel" of the system's reproductive power.*

2. Turn the Balance and Fader Controls to their extreme positions and listen to the corresponding results. The sound should track the action of the control. If not, there may be a polarity mix-up somewhere in the wiring. Check the Troubleshooting Guide at the back of this manual.
3. Increase the Volume Control and verify that the Cobalt Amplifier provides the desired volume at full frequencies without distortion. If you hear distortion, check the connections and verify that the GAIN Calibration is correct. Another possibility is damaged or under-rated speakers. Once again, check the Troubleshooting Guide for additional help.



SYSTEM ADJUSTMENTS

Important: You will get less system noise if you keep the amplifier gain as low as possible. This can be accomplished best with a pre-amp, such as the 300 PHD.

If there are no accessories (equalizers, crossovers, etc.) used in the system:

1. Turn off all power.
2. Set the Gain controls on all amplifiers to their minimum position.
3. Turn on the power to the amplifiers. Turn on the radio and set the Volume control to approximately 3/4 volume.
4. Adjust the Gain control on each amplifier until distortion is heard, then back the gain down a touch until no distortion is perceived.

If Orion Accessories Are Being Used:

If you are adjusting a system containing Orion accessories refer to the adjustment procedures contained in each applicable Orion accessory manual.

In general, make the adjustments as follows:

1. Turn all power off.
2. Set the gain controls on all amplifiers to their minimum positions.
4. Set all frequency controls on the 300 PHD Equalizers to flat response (dots in top center position).
5. Turn gain controls all the way down on the pre-amp.
6. Turn on power to amplifiers. Turn on the radio and set the Volume control for approximately 3/4 volume.

If the input gain controls on the 300 PHD does not produce full volume, increase the gain setting of each amplifier as required. Decrease the setting of the Volume control on the 300 PHD to desired listening level.



CAUTION: BE SURE TO TURN OFF THE POWER WHEN DISCONNECTING AND RECONNECTING CABLES.



TROUBLESHOOTING GUIDE

This section provides you with a catalog of amplifier symptoms and their probable causes and solutions. Before you start troubleshooting, make sure the vehicle's electrical system is working properly by verifying that other electrical items (e.g. headlights, windows, etc.) still function correctly.

SYMPTOM	PROBABLE CAUSE	SOLUTION
No Audio	Low or No Remote Turn-On connections	Check remote turn-on voltage at amp and head unit
	Blown Fuse	Replace with new fast-blow fuse
	Power wires not connected	Check butt splices or solder joints; check Ground and Battery connections
Blown speakers or not connected		Use VOM or DVM to measure speaker coil impedance; check speaker wiring connections
Audio cycles on and off	Thermal Protection Circuit is properly shutting amplifier off each time it gets too hot	Check location for adequate ventilation; check speaker wiring for a short to chassis
Distorted Audio	Input Sensitivity not set properly or damaged speaker cones	See Calibrating Input Sensitivity procedure and check each step; inspect each speaker for damage and repair or replace suspected component
	Low turn-on voltage	Refer to head unit owner's manual
Audio level low	Mute circuit is on	Check electrical system for low voltage; check ground connection
Audio lacks	Speakers wired with wrong polarity, causing cancellation of bass frequencies	Check polarity of wires from amplifiers to each speaker as defined by the system design
External fuse blowing	Incorrect wiring or short circuit	Refer to Electrical Installation and check each installation step
Whining noise on audio with engine running	Amplifier is picking up alternator noise	Install an in-line noise filter on the head unit power wire; check alternator diodes or voltage regulator for proper operation
Ticking noise on audio with engine running	Amplifier is picking up radiated spark noise	Check RCA audio cables routes; install an in-line noise filter on the head unit power wire

SPECIFICATIONS

Model	CO 230	CO 260	CO 430	CO 2100
Output Power per channel, all channels driven into 4 Ω @ 12V	30 x 2	60 x 2	30 x 4	100 x 2
Distortion maximum at 4 Ω, 20 to 20kHz	0.03%	0.03%	0.03%	0.03%
Frequency Response ±0.5 dB	10Hz to 30 kHz	10Hz to 30 kHz	10Hz to 30 kHz	10Hz to 30 kHz
Signal to Noise	+100dB	+100dB	+100dB	+100dB
Input Sensitivity	150mV + Up	150mV + Up	150mV + Up	150mV + Up
Output Load	2Ω to 16Ω	2Ω to 16Ω	2Ω to 16Ω	2Ω to 16Ω
Idle Current	500mA	500mA	500mA	500mA
Current Draw	7 Amps	14 - 20 Amps	21 - 30 Amps	21 - 30 Amps
Damping Factor	Greater than 200	Greater than 200	Greater than 200	Greater than 200
Slew Rate	15 Volts per µsec	15 Volts per µsec	15 Volts per µsec	15 Volts per use
Stereo Separation	+80dB	+80dB	+80dB	+80dB
Bridgeable	Internal Mixed	Internal Mixed	Internal Mixed	Internal Mixed
Crossover	N/A	N/A	N/A	35-200Hz @ 12dB/oct
Size	7" x 8 1/8" x 2 1/16"	9" x 8 1/8" x 2 1/16"	11" x 8 1/8" x 2 1/16"	13" x 8 1/8" x 2 1/16"

HIGH PERFORMANCE
CAR AUDIO AMPLIFIERS,
SIGNAL PROCESSORS
AND LOUDSPEAKERS.
MADE IN THE USA.

